Rapid Assessment, Surveys and Surveillance

Faculty of the
Center of Excellence in
Disaster
Management and
Humanitarian Assistance

Lecture Objectives

- Discuss the operational objectives of a rapid health assessment
- Describe the key elements of data to be collected during a rapid assessment
- Outline data collection methods for a rapid assessment
- Describe the key elements of data to be collected during public health surveys and surveillance

5 Things To Think About

1. Data quality range: very bad to very good
2. Better data allows better short-term decisions
   - Better decisions save lives
3. Better data allows better long-term analysis
   - Better analysis means better understanding
4. Get the best data possible: match your data needs with your capabilities
5. Standardization is good

Introduction

Disaster Medicine and Complex Humanitarian Emergencies

- Language and terminology
- Basic principles

Phases of Disaster Response

- Emergency - life saving interventions
- Recovery - crisis has peaked
- Rehabilitation - program development, reestablishment of infrastructure, improve level of preparedness and skills

Why data is needed

Short-term:

To determine

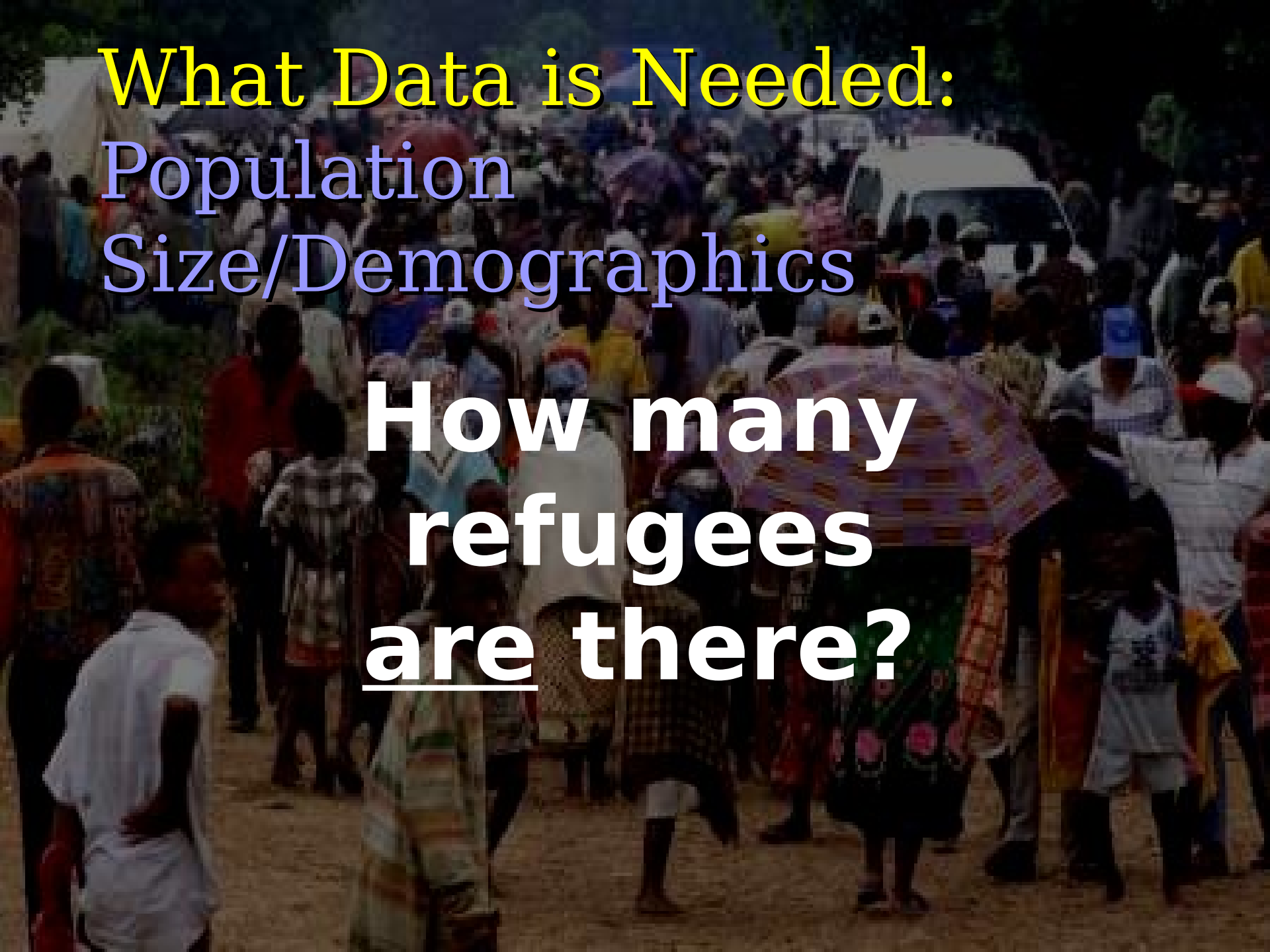
- Magnitude of emergency
- Needs / issues
- Priorities
- Resources
- Effect of relief efforts

Long-term:

To learn from what we do

Magunga Camp

Adrian



What Data is Needed:

Population Size/Demographics

How many refugees <u>are</u> there?

What Data is Needed:

- Population Size and Demographics
- Health Information
  - Morbidity/Mortality
  - Nutritional Status
  - Health System
  - Environmental Health
  - Available Resources

What Data is Needed: Population Size/Demographics

- Total population
  - Denominator for rates
  - Quantity of relief supplies
  - Quantity of relief personnel (force protection issue)

- Age and sex structure
  - Denominator for age and sex-specific rates
  - Identifying vulnerable groups
  - Targeting programs, e.g. immunizations

What Data is Needed:

Population Size/Demographics

Orphaned children in Chokolane refugee camp 3/7/00 (AP Photo/Karel Prinsloo)

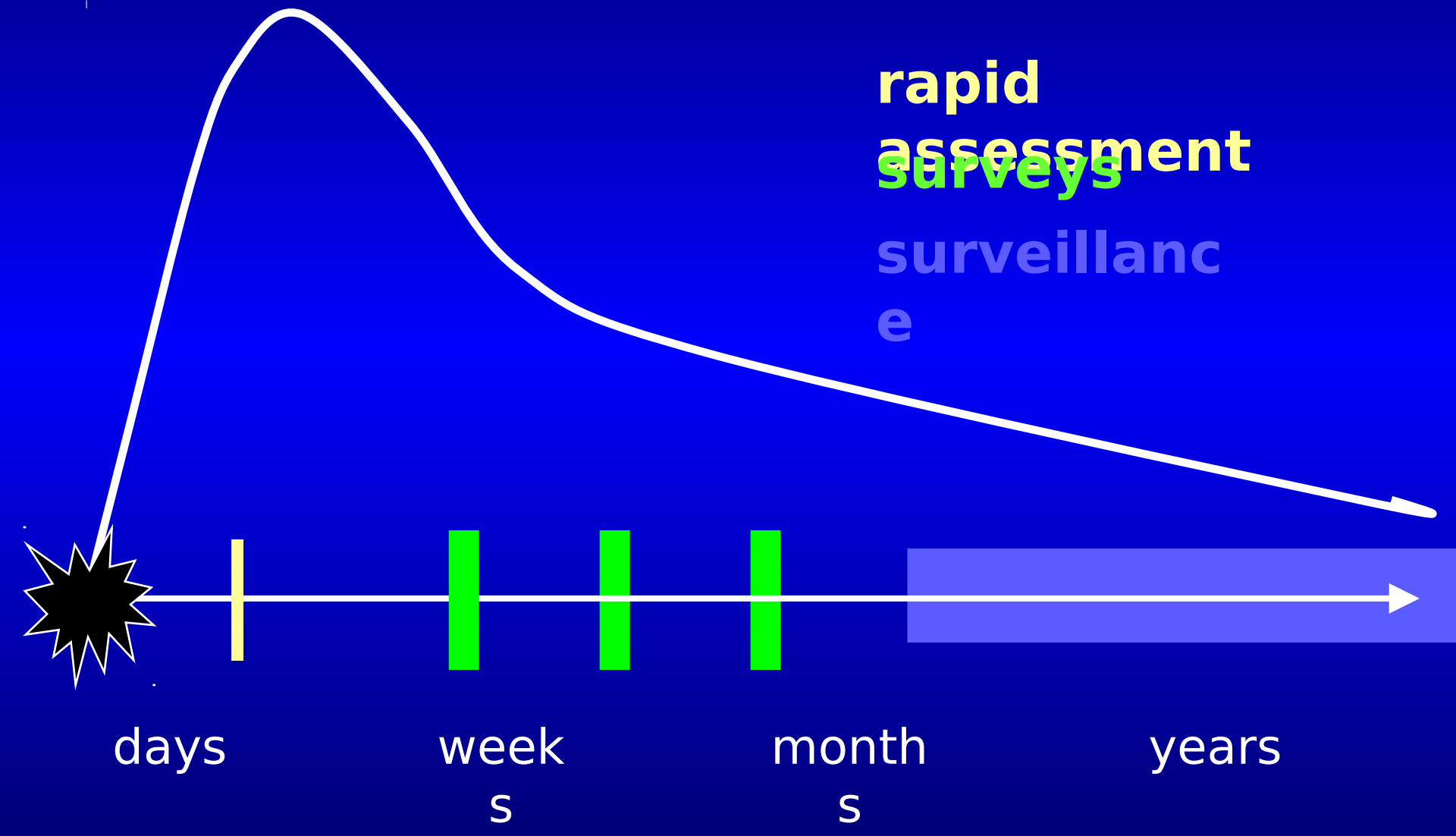
How Data is Collected

Burmese refugee children, Thai-Burma border 9/00 (J. Selanikio)

Types of Data Collection

- Rapid Assessment - initial overview of immediate impact and needs
- Surveys - intermittent, focussed
- Surveillance - ongoing data collection

How Data is Collected:



Rationale

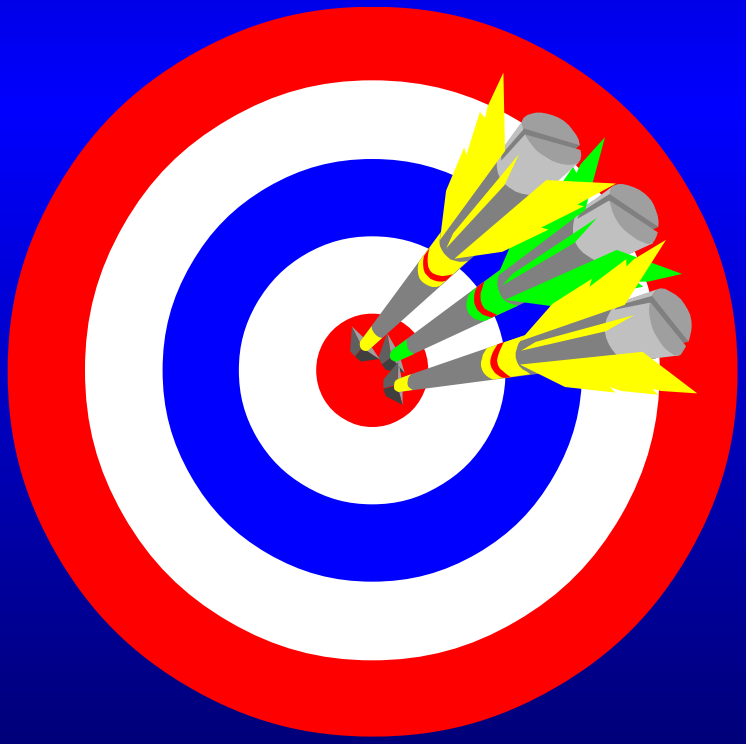
- Provides objective information essential for:
  - planning and prioritizing
  - implementation of health programs
  - evaluation of emergency relief
  - identifies health issues for surveys and surveillance

Rationale

- Previous responses - ad hoc; inappropriate; ineffective
- Myth of disaster relief - all aid is good
- Most humanitarian assistance should await adequate assessment

Rapid Assessment

Objectives



5 Objectives

- Data collection and interpretation to determine:
  1. Magnitude of emergency
  2. Health and nutrition needs
  3. Availability of local resources
  4. Need for external resources
  5. Establish health information system

Rapid Assessment: Types of Data

Sample Water, Sanitation and Environment Forms

(Please note: these forms should be adapted to the particular situation and follow the initial assessment recommendations.)

Place: ..... **Reported by:** .....

From: ...../...../..... **To:** ...../...../.....
day/month/year day/month/year

• Water

	No. of litres/day	Population	No. of litres/pers/day	Objective
Water supply				15 litres/p/day

	No. of water points	Population	No. of pers./water point	Objective
Water supply				200 pers./water point

• Sanitation

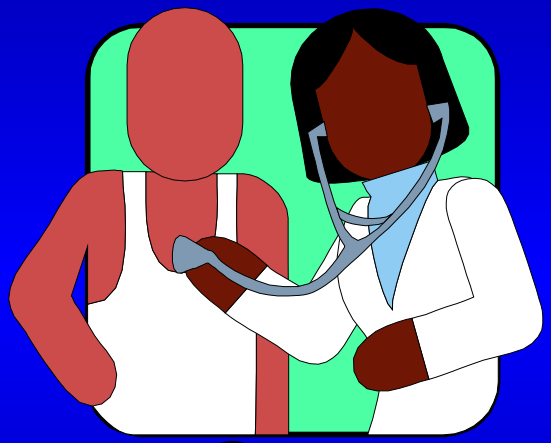
	No. of latrines	Population	No. of persons /latrine	Objective
Latrines				20 persons/latrine

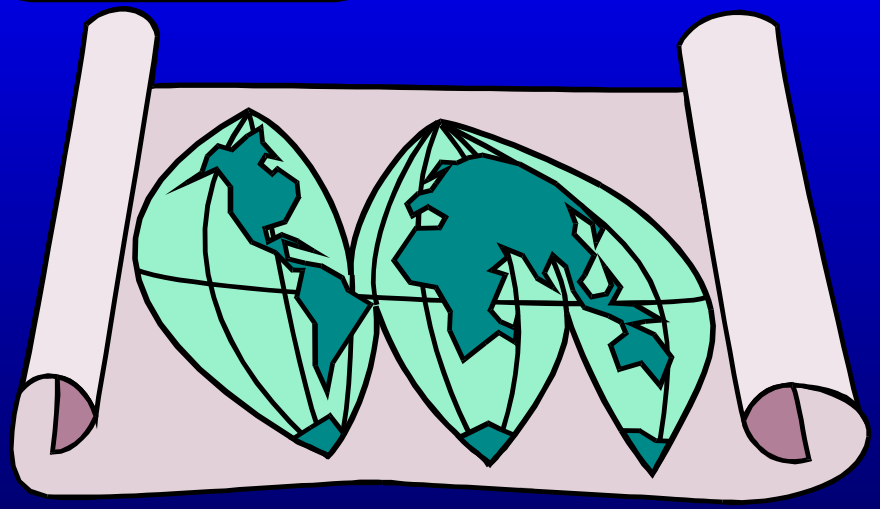
• Crowding (space/person)

	Surface area in m^2	Population	M^2 per person	Objective
Crowding				$30m^2$/person

Comments: .....

Source: MSF (1997), *Refugee Health, An Approach to Emergency Situations*. Macmillan. London.





Types of Data

- Background political, social, economic
- Size and demographics of population

Types of Data

- Vital health information
  - background health problems
  - sources of health care
  - mortality rates
  - morbidity - incidence rates
  - nutritional status
  - environmental health
  - impact of disruption of health services

Rapid Assessment

5 Principles

Principle 1

- Data collection commences before field assessment
  - country profile - WWW, CIA, COE, DOS
  - maps - CIA
  - background health data - CDC, AFMIC, previous reports
  - in-country - government, UN, NGO's

What Data is Needed: Background Data

- Major health problems (e.g. infectious, chronic)
- Structure of health system
  - Clinics
  - Existing public health programs (e.g. immunizations)
  - Alternative sources of health care (e.g. traditional healers)

Principle 2

- Assessment and emergency response occur simultaneously

  - emergency in individual patient (A, B, C)

  c.f.

  - emergency in population (food, water, shelter, sanitation, security)

Principle 3

- Epidemiologic limitations of data
  - issues related to security and urgency - quality of data
  - "quick and dirty" methods
  - usually cannot collect primary data - rely on other sources

How Data is Collected:
Rapid Assessment Principles

1. If you don’t need it, don’t collect it
2. Interdisciplinary team required
3. Standardized methods
4. Remember limitations of data

Principle 4

- Interdisciplinary team required
  - usually 3-5 members
  - skills in epidemiology, nutrition, water and sanitation, logistics
  - members from host country
  - language skills - trained interpreters

Principle 5

- Standardized methods of data collection and reporting
  - previously little standardization - Somalia; Rwanda
  - WHO rapid assessment protocols
  - flexibility in data collection

Methods: Population Size and Demographics

- Refugee camps
  - registration system - establish early
  - surveys - convenience sample, cluster sample
  - visual inspection & aerial photographs
  - problems
    - overestimates of population
    - poor cooperation, e.g. Goma

Methods: Population Size and Demographics

- Urban environment / developed country
  - city/county records
  - household surveys e.g. Beirut
  - beneficiaries of aid e.g. Bosnia

Methods: Vital Health Information

- Background Data
  - Methods of collection
    - interviews with key informants
    - review of records from health facilities, government departments, NGO's
    - direct observations of population and environment
    - limited surveys

Methods: Vital Health Information

- Background Data
  - major health problems e.g. infectious, chronic
  - structure of health system
  - sources of health care, e.g. traditional healers
  - important health beliefs and traditions
  - pre-existing public health programs, e.g. immunizations

Shaman

Mongolian

Traditional Healer

San-Namibia

Adrian

American Refugee Committee - Photo

Vaccination Program - WHO

Methods: Vital Health Information

Mortality Rates

- Crude mortality rate - CMR
  - most specific indicator of population's health
  - total deaths/10,000/day
  - post-emergency - deaths/1,000/month
- Under 5 mortality rate - U5MR
  - total deaths <5years/10,000/day

Methods: Vital Health Information

Mortality Rates

- CMR
  - baseline 0.5 deaths/10,000/day
  - effective relief <1.0 deaths/10,000/day
  - serious 1.0-2.0 deaths/10,000/day
  - crisis >2.0 deaths/10,000/day
  - Goma ~31 deaths/10,000/day
- U5MR
  - baseline 0.8-1.2/10,000/day
  - serious ≥4.0/10,000/day

Methods: Vital Health Information

Mortality Rates

- Cause Specific Mortality Rates
  - proportion of deaths due to specific disease, e.g. Sarajevo, trauma = 57% deaths
  - relevance to MOE's
- Case Fatality Rates
  - proportion of individuals with specific disease that die, e.g. Goma, CFR for cholera = 25%
- Age- and Sex- Specific Mortality Rates
  - collected later

Methods:
Vital Health Information

Mortality Rates

- RATES ESSENTIAL!!
  - c.f. simple tallies of disease
  - follow trends
  - compare populations
  - relevance to ongoing surveillance

How Do We Calculate CMR? (post-ER units)

$$\text{CMR} = \frac{\text{total \# of deaths (in 1 month)}}{\text{total population (at midpoint of time period)}} \times 1{,}000$$

$$= \frac{14 \text{ deaths}}{33{,}000 \text{ people}} \times 1{,}000 \times \frac{1 \text{ months}}{2}$$

month

= 0.21 deaths / 1,000 / month

How Do We Calculate CMR? (ER units)

$$\text{CMR} = \frac{\text{total \# of deaths (in 1 day)}}{\text{total population (at midpoint of time period)}} \times 10{,}000$$

$$= \frac{14 \text{ deaths}}{33{,}000 \text{ people}} \times 10{,}000 \times \frac{1 \text{ day}}{62 \text{ days (2 mos)}}$$

$$= 0.07 \text{ deaths / } 10{,}000 \text{ / day}$$

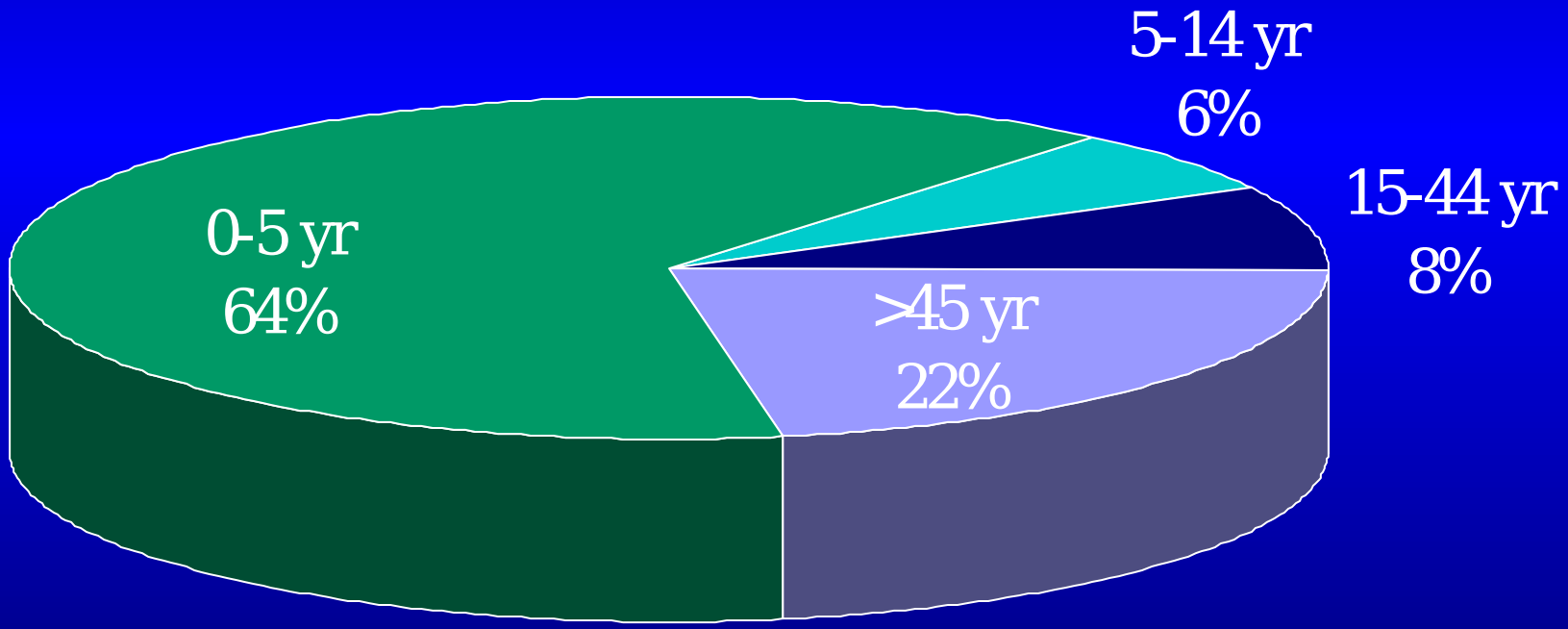
Conversion btw:

deaths/10,000/day to deaths /1,000/ mos

= x3

Methods:
Vital Health Information

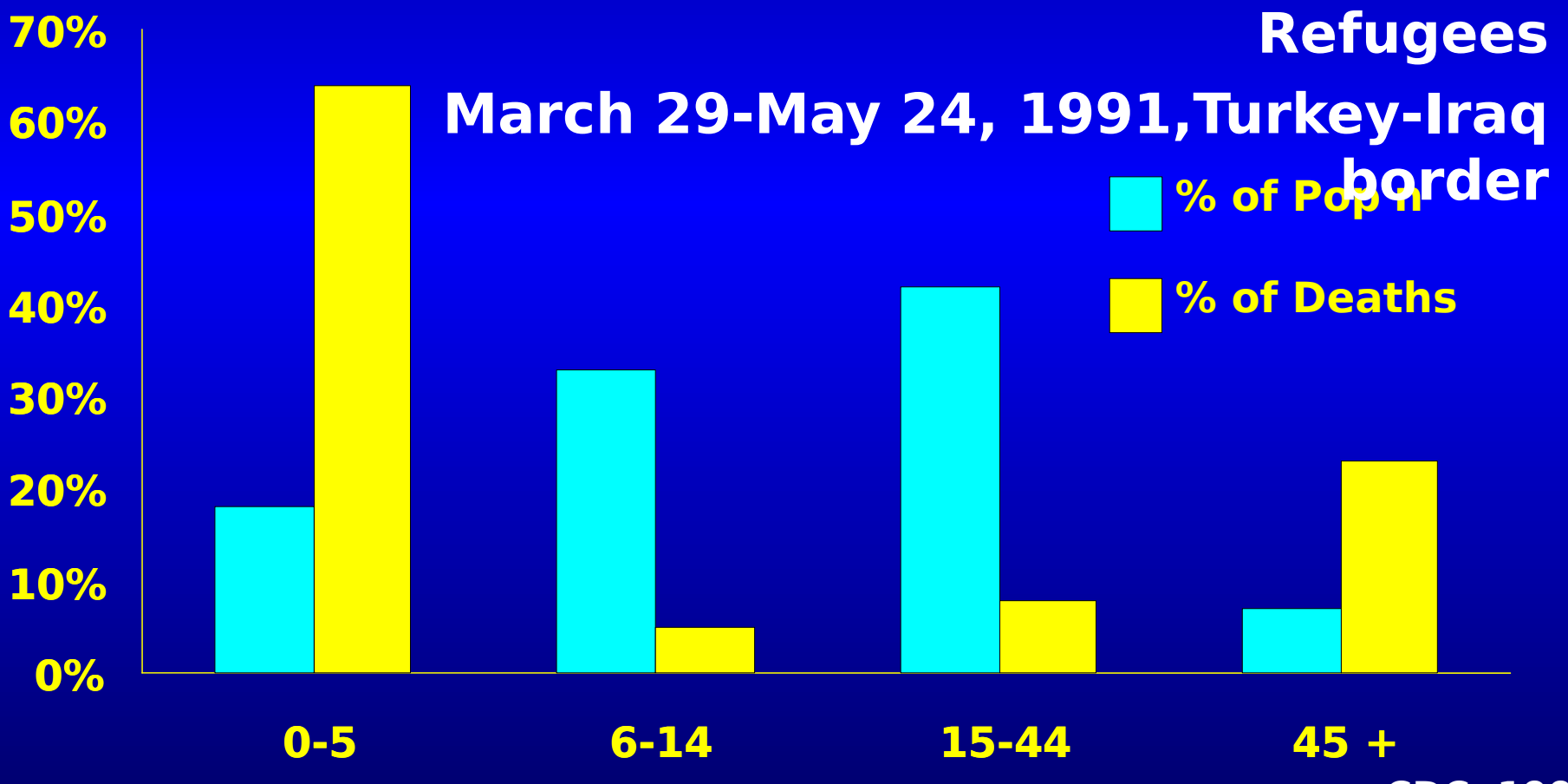
Death by age, Kurdish refugees, March 29-May 24, 1991, Turkey Iraq border



Source: CDC, 1991

What Data is Needed:

Mortality Rates: Age-Specific



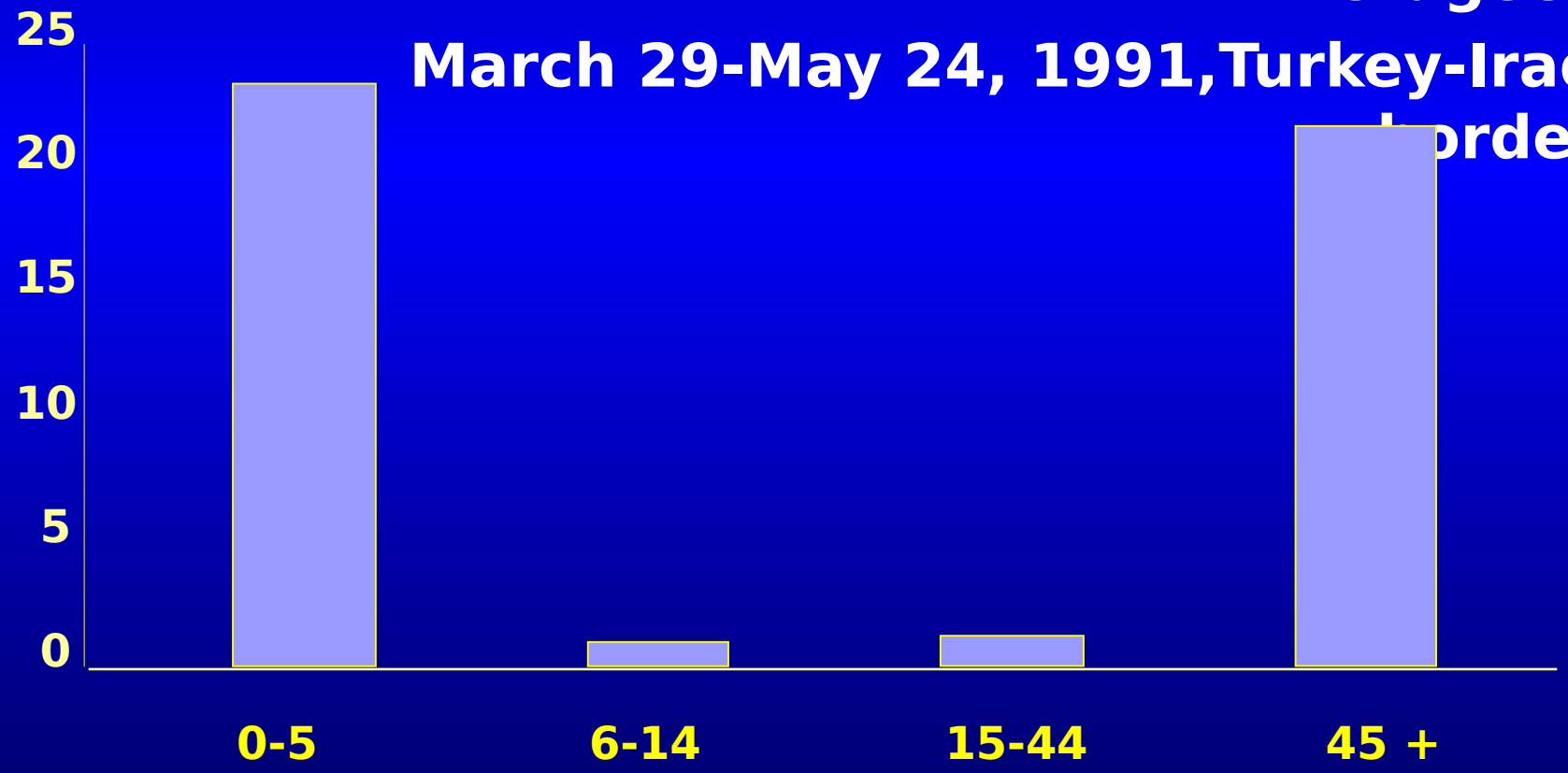
CDC, 1991

What Data is Needed:

Mortality Rates: Age-Specific Ratio

Death by Age Among Kurdish Refugees

March 29-May 24, 1991,Turkey-Iraq border



CDC, 1991

Methods:
Vital Health Information

Mortality Rates

- Difficult to obtain accurate data
  - under-reporting of deaths
  - exaggeration of population size

- Sources of information
  - hospital, burial records
  - 24 hour grave site surveillance
  - burial shrouds issued
  - Goma - truck drivers

Methods:
Vital Health Information

Morbidity Data

- Data re major causes of illness allows:
  - more efficient planning
  - better use of limited resources

Methods:
Vital Health Information

Morbidity Data

- Rates of disease with public health importance
  - diarrheal disease
  - acute respiratory infections (ARI)
  - measles
  - malaria
- Rates of disease with epidemic potential
  - meningitis
  - hepatitis

Methods:
Vital Health Information

Morbidity Data

- Standardized data collection - surveillance

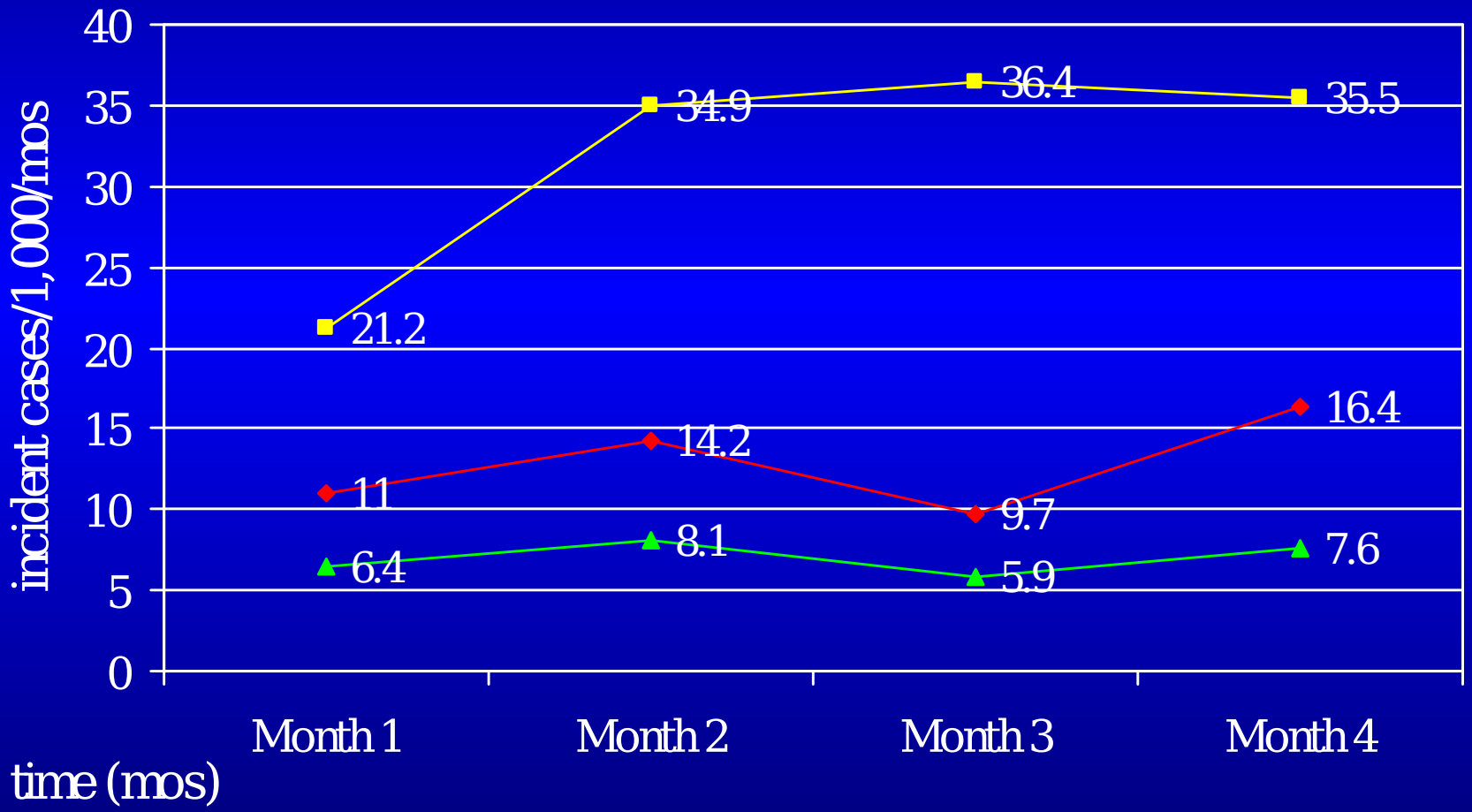
- No standardized reporting system
  - difficulties determining denominator
  - repeat presentations

Methods:
Vital Health Information

Morbidity Data

- Methods of presenting data
  - proportional morbidity - % patients seen with specific condition , e.g. cholera = 57%
  - tallies
  - disease attack rate, e.g. cholera = 7 - 16%
  - incidence = cases/1,000/month

Surveillance - morbidity
Disease Incidence Rates



Methods
Vital Health Information

- Morbidity Data
- Morbidity Data
  - Sources of morbidity data
    - records from hospitals, clinics, feeding centers
    - interviews with health workers
    - short surveys, using convenience sample, cluster sample
  - Establish surveillance system ASAP

Methods:
Vital Health Information

Nutritional Status

- Rationale
  - acute child (<5 years) malnutrition rates next most specific indicator of population's health
  - determines urgency of ration delivery, supplementary feeding
- Aim
  - prevalence of acute protein-energy malnutrition
  - prevalence of micronutrient deficiencies

Methods: Vital Health Information

- Nutritional Status
  - Types of data - acute malnutrition
    - mid-upper arm circumference (MUAC)
    - weight-for-height - Z-scores
    - clinical evidence of micronutrient deficiency, e.g. Vit A, Vit C, anemia
  - Levels of acute malnutrition
    - moderate
    - severe
    - edema/kwashiorkor = severe

Photo: R. Brennan

Poto: R.Brennan

Adrian

Methods:
Vital Health Information

Nutritional Status

- Prevalence of acute malnutrition
  - serious > 10% population < 5 years
  - critical > 20%; edema/kwashiorkor
  - Somalia 80% (1991)
    Ethiopia 50% (1985)

Methods:
Vital Health Information

Nutritional Status

- Sources of information
  - surveys on convenience sample
  - screening new arrivals
  - valid cluster sample survey ASAP

What Data is Needed: Impact on Health System

- Loss of staff - Sarajevo, Tajikistan
- Destruction of infrastructure - Chechenya, Kosovo, East Timor
- Discontinuation of PH programs
  - Immunizations
  - Vector control
  - Maternal child health

Impact on Health System

What Data is Needed: Environmental Data

- Water
  - 15 - 20 liters/person/day
  - Quality vs. quantity
  - Sources and accessibility
- Sanitation services
  - Types of facilities: latrines, fields
  - Recommended: pit latrine/family
  - Minimum: pit latrine/20 people

Methods:
Vital Health Information

Environmental Health

- Shelters
  - type, e.g. structures, tents, plastic sheeting
  - % households without water resistant shelter
  - % households without any form shelter
  - recommended = 3.5m^2/person
- Fuel
  - types, access - security
  - recommended 5kg wood/family/day

What Data is Needed:
Environmental Data

Refugee boys gather firewood near the Chechen border, 3/5/00
(AP: Musa Sadulayev)

Shelters

Photo: R. Brennan

Methods:
Vital Health Information

Resources Available

- Local health services
  - facilities - condition & size
  - personnel
  - supplies; infrastructure
- Camp health services
  - facilities - condition & size
  - personnel
  - supplies; infrastructure

Health Services

Limitations of Rapid Assessment

SOUND METHODOLOGY

V.

SECURITY

TIME CONSTRAINTS

Limitations of Rapid Assessment: Deficiencies of Data

- Incomplete
  - lack of access
- Secondary data
  - bias - government reporting
  - under-reporting
  - low sensitivity
- Not population based - ?denominator
- Limited generalizability / external validity

Rapid Assessment: Review of Data Collected

- Population size and demographics
- Background health information
- Mortality rates - CMR, U5MR
- Morbidity data
- Nutritional status
- Environmental health
- Resources available

➨ aware of data limitations

Rapid Assessment: Review of Objectives

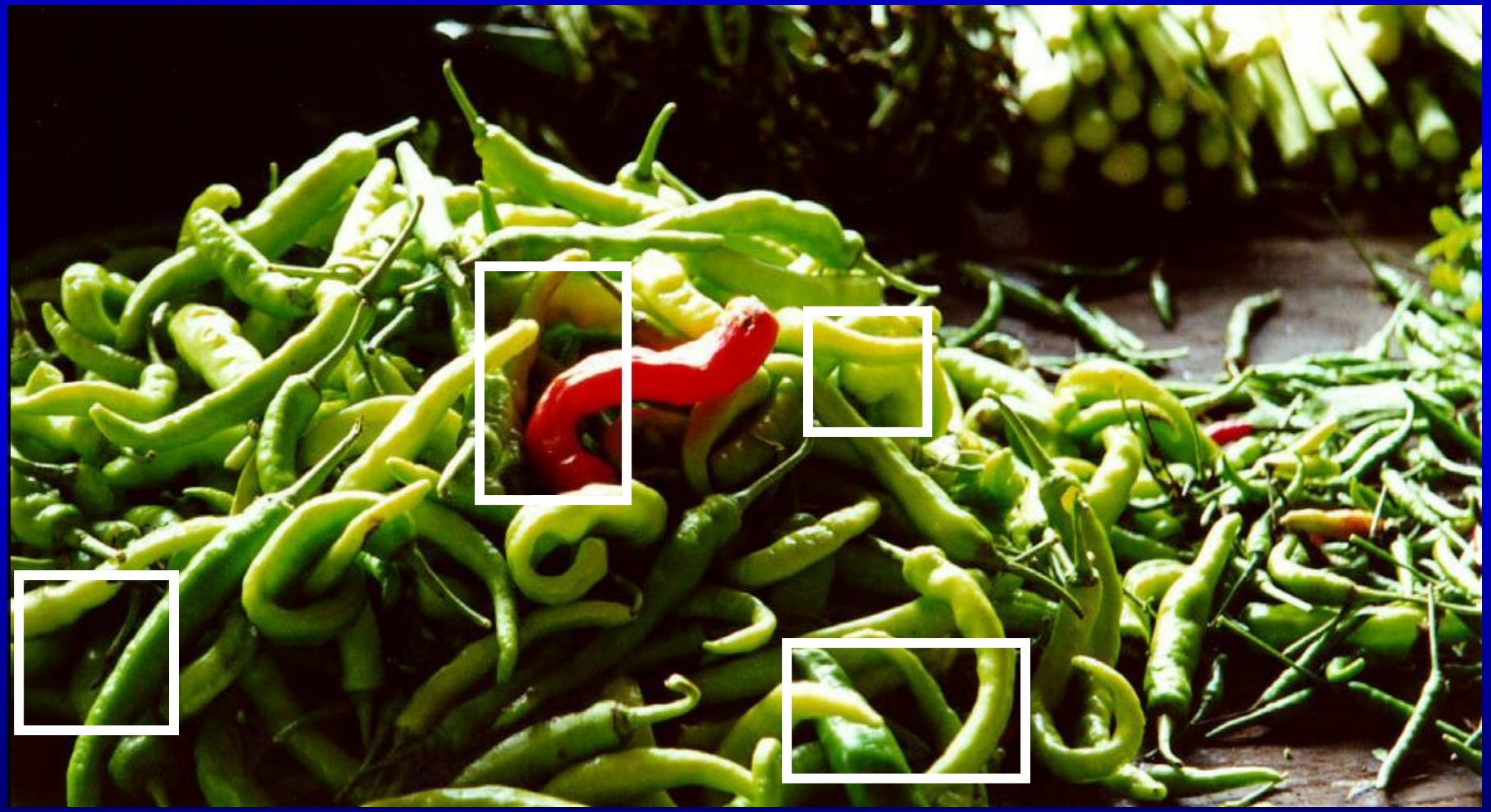
- Data collection and interpretation to determine:
  1. Magnitude of emergency
  2. Health and nutrition needs
  3. Availability of local resources
  4. Need for external resources

- What is 5th objective?

Rapid Assessment: Review of Objectives

- Establish Health Information System (HIS)
  - Surveys
  - Surveillance

How Data is Collected: Sampling



Three advantages of cluster sampling:

- Almost as good as SRS
- Don’t need a list of households / residents / refugees
- Fewer interviews: less travel, fewer personnel, faster

Health Information System

- Objectives
  - monitor trends - mortality, morbidity, nutrition
  - prioritize or redirect PH programs
  - detection of epidemics
  - evaluate health care interventions

- Establishing HIS
  - refugee camp - de novo
  - developed country (e.g. Lebanon, Bosnia) - rehabilitate

SURVEYS

Surveys

- Definition

  Intermittent, focussed assessments that collect population-based health data

- Supplement
  - rapid assessment
  - ongoing surveillance
  - ➡ bridge 3 phases emergency response

Types of Surveys

- comprehensive
- randomized
- systematic
- 2 stage cluster

go to cluster survey example...

Surveys

- Health issues assessed by surveys
  - population size and demographics
  - mortality - rates; cause of death
  - morbidity - attack rates; incidence
  - nutrition
  - environmental health - quantity, quality
  - program indicators, e.g. immunization rates

Nutrition Surveys

- Data collected
  - acute and chronic malnutrition < 5 yrs; ??adults
  - micronutrient deficiencies
  - daily rations
    - recommended 1,900-2,200 kcal/day
    - critical <1, 500 kcal/day
  - weight loss / weight gain in clinics
- Frequency

SURVEILLANCE

Definition

Ongoing, systematic collection, analysis and interpretation of health data

How Data is Collected: Surveillance: Principles

1. If you don't need it, don't collect it
2. All health agencies and facilities involved vs. sentinel sites
3. Simple, standardized form - daily/weekly
4. Simple, standard case definitions
5. Compare with known yardsticks

Surveillance - morbidity: Example –

	0-4 yrs		5+ yrs		
Cause	**Male**	**Female**	**Male**	**Female**	**Total**
Diarrheal disease					
Resp disease					
Malnutrition					
Measles					
Malaria					
Other					
Repeat cases					
TOTAL					
Total <5 yrs			**XXXX**	**XXXX**	**XXXX**

Examples of Case Definitions

Disease	Definition
Measles	Fever, cough, rash, conjunctivitis
Malaria	Fever and periodic shaking, chills
Watery Diarrhea	More than 4 stools per day, but no blood or rice-water in stool
Lower Respiratory Infection	Fever, cough, rapid breathing (x breaths per minute-dep. upon age)

For other examples, refer to:
-MSF book/clinical guidelines
-WHO

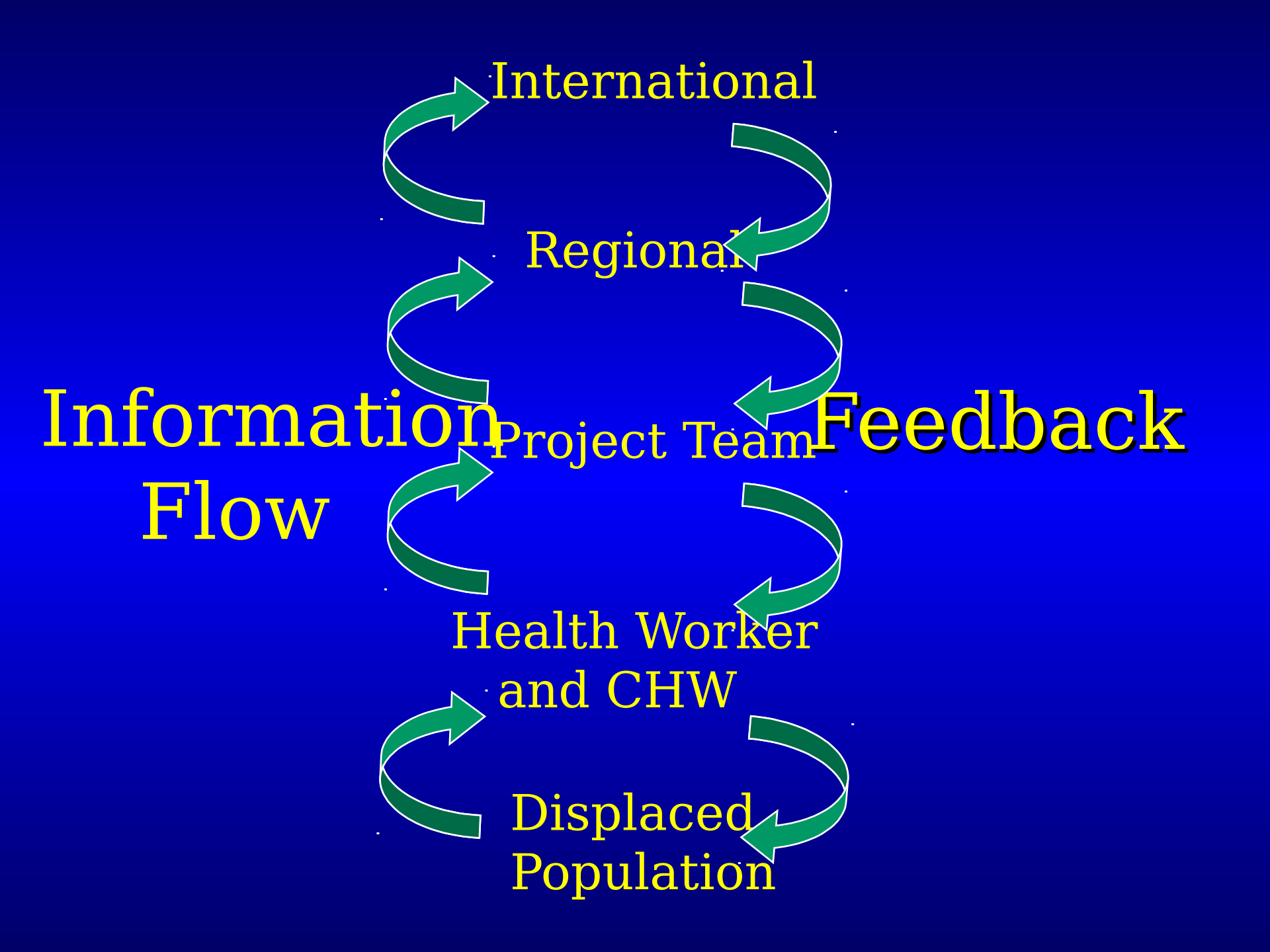
Surveillance

Key Principle:

ONLY COLLECT DATA WHICH ARE

USEFUL AND CAN BE ACTED UPON

IN THE FIELD!!!

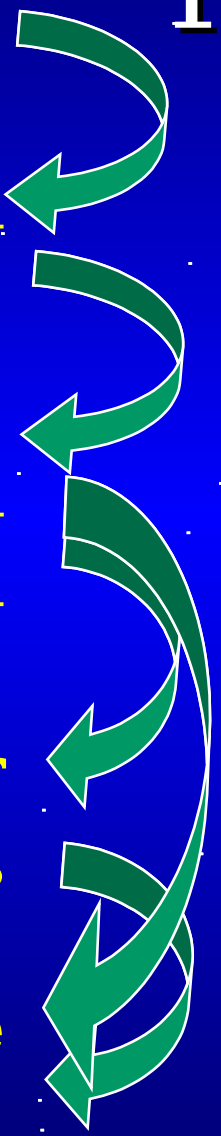

International
Regional
Information Flow
Project Team
Feedback
Health Worker and CHW
Displaced Population

Surveillance - Information Flow

Monthly report of ALL activities in region. Helps determine budget, logistics, etc. Used to see that mission is on track with goals and objectives. Also allows for advocacy /media relations.

Analyzes data and responds appropriately
in the field. Shares data at monthly meetings of
NGOs, MOH, and UNHCR
Keep daily tally and turn in weekly surveillance forms. Notify any reportable disease immediately or any unfamiliar clinical presentations

Surveillance - Feedback



nternational

Regional

roject Team in the field

alth Worker and CHWs

Displace d Populati

Grant approval on major changes in pr
especially involving $$$ or politically s

Prioritize or redirect health programs
Evaluate health care interventions

Allocate staff and resources in most effective
manner. Motivate and involve staff in program;
modify surveillance forms and programs.

Immediate action as needed in epiden

Improve gaps in data collection.
Health education and promotion
Change in emphasis on care/treatmen

Surveillance

- Population and Demographics
  - total population
  - age and sex distribution
  - rate of new arrivals and departures
  - vulnerable groups, e.g. unaccompanied children, pregnant women

Surveillance

- Mortality
  - mean daily CMR
  - age-specific mortality rates
  - sex-specific mortality rates
  - cause-specific mortality rates
  - case fatality rates

Surveillance

- Morbidity
  - proportional morbidity (especially acute)
  - incidence rates for primary causes of disease
    - infectious disease
  - age- and sex- specific incidence rates
  - changes in severity of disease or CFR
  - cases of disease not previously reported
  - tallies
  - attack rates

Surveillance

- Nutrition
  - assessed primarily by surveys

Surveillance

- Program Indicators
  - immunization coverage
  - supplementary feeding program enrollment and attendance
  - antenatal and postnatal clinic coverage
  - clinic attendance

Surveillance - Summary
Putting It All Together

1. Rapid changes in disease trends
   - can signal unrest, instability, epidemics
2. Denominator effects rates!
   - Observe large changes in migration, inflated census, etc..
3. Overall patterns
   - malnutr'n data together with U5 mortality rates over time
4. Closeness to established targets / markers
   - measles immunization rate: 95%
   - CMR > 1.0 death/10,000/day (>3.0 / 1000 / mos) indicates danger

Data Collection - Review

- Three phases of disaster response
  - Emergency
  - Recovery
  - Rehabilitation

- Three phases of data collection
  - Rapid Assessment
  - Surveys
  - Surveillance

Data Collection - Review

- Population and Demographics
- Vital Health Related Data
  - mortality - CMR, U5MR
  - morbidity - proportional morbidity, incidence
  - nutritional status - acute, chronic
  - impact on health system
  - environmental health
  - resources available
  - ➡ limitations of available data

Errors using even inadequate data are much less than those using no data at all.

-- Charles Babbage